'*On the Memory of a Lady to whom the Translations of Pindar's Odes were, from time to time, communicated as the work proceeded.*

'Oh! that the echo of my Lydian lyre
Could reach the tomb where fair Euphrasia lies!
She who so charm'd my trembling minstrelsies,
Which now her touch shall mend, her smile inspire
No more;—then not unmov'd thine ear should learn,
Blest Saint! what tears for thee thy widower pour'd,
What kindred hearts thy early doom deplor'd,
What incense pure from friendship's sacred urn
Breathed o'er thy laurell'd shrine.—Who now shall find
Learning with virtue join'd in beauty's frame—
And taste, and glory's love, and freedom's flame—
And wit's quick flash, the lightning of the mind!
These were thy gifts—which thus regret pourtrays
In strains unworthy thee—that live but in thy praise.'

Art. III.—*On the Connexion of the Physical Sciences.* By Mrs. Somerville.

THERE are two different ways in which *Physical Science* may be made popularly intelligible and interesting; by putting forward the things of which it treats, or their relations;—by dwelling on the substance of discoveries, or on their history and bearing;—by calling up definite images and trains of reasoning; or by taking these for granted, and telling what can be told in general terms concerning such matters. Popular knowledge of the former kind ought to be conveyed by the public lecturer, when, by means of his models, his machines, his diagrams, he exhibits to the senses complexities of form and position which it would baffle us to conceive without such sensible representations. Popular knowledge of the latter kind may be conveyed by the same lecturer, when, turning from his apparatus, he explains to his audience the progress and prospects of his science, the relation of what is now doing to that which has already been done, the bearing of new facts in one subject upon theory in another. Each of these two methods has its appropriate place and its peculiar advantages. The former excites notions perfectly distinct as far as they go, but is necessarily very limited in extent, because such notions cannot be caught and held without close attention and considerable effort; the latter method presents to us rapid views of connexion, dependence, and promise, which reach far and include much, but which are on that account necessarily incomplete and somewhat vague.

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This latter course is, however, by no means without its use and value: for, strange as it may seem, it is undoubtedly true, that such general aspects of the processes with which science is concerned may be apprehended by those who comprehend very dimly and obscurely the nature of the processes themselves. Words can call up thought as well as things; and, in spite of the philosophers of Laputa, with their *real* vocabulary, the trains of reflection suggested in the former way are often more to our purpose, because more rapid and comprehensive, than those we arrive at in the latter mode. The office of language is to produce a picture in the mind; and it may easily happen in this instance, as it happens in the pictures of some of our un-Pindaric artists, that we are struck by the profound thought and unity displayed in the colouring, while there is hardly a single object outlined with any tolerable fidelity and distinctness. The long-drawn vista, the level sunbeams, the shining ocean, spreading among ships and palaces, woods and mountains, may make the painting offer to the eye a noble expanse magnificently occupied; while, even in the foreground, we cannot distinguish whether it is a broken column or a sleeping shepherd which lies on the earth, and at a little distance we may mistake the flowing sleeve of a wood-nymph for an arm of the sea. In like manner, language may be so employed that it shall present to us science as an extensive and splendid prospect, in which we see the relative positions and bearings of many parts, though we do not trace any portion into exact detail—though we do not obtain from it precise notions of optical phenomena, or molecular actions.

Mrs. Somerville's work is, and is obviously intended to be, a popular view of the present state of science, of the kind we have thus attempted to describe. In her simple and brief dedication to the Queen, she says, 'If I have succeeded in my endeavour to make the laws by which the material world is governed, more familiar to my countrywomen, I shall have the gratification of thinking, that the gracious permission to dedicate my book to your Majesty has not been misplaced.' And if her 'countrywomen' have already become tolerably familiar with the technical terms which the history of the progress of human speculations necessarily contains; if they have learned, as we trust a large portion of them have, to look with dry eyes upon oxygen and hydrogen, to hear with tranquil minds of perturbations and excentricities, to think with toleration that the light of their eyes may be sometimes polarized, and the crimson of their cheeks capable of being resolved into *complementary colours*;—if they have advanced so far in philosophy, they will certainly receive with gratitude Mrs. Somerville's able and *masterly* (if she will excuse this word) exposition

of

of the present state of the leading branches of the physical sciences. For our own parts, however, we beg leave to enter a protest, in the name of that sex to which all critics (so far as we have ever heard) belong, against the appropriation of this volume to the sole use of the author's country*women*. We believe that there are few individuals of that gender which plumes itself upon the exclusive possession of exact science, who may not learn much that is both novel and curious in the recent progress of physics from this little volume. Even those who have most sedulously followed the track of modern discoveries cannot but be struck with admiration at the way in which the survey is brought up to the present day. The writer 'has read up to Saturday night,' as was said of the late Sir Samuel Romilly; and the latest experiments and speculations in every part of Europe are referred to, rapidly indeed, but appropriately and distinctly.

We will give one or two extracts. We take one concerning Halley's comet; the more especially as this remarkable visiter is expected to reappear next year.

'Halley computed the elements of the orbit of a comet that appeared in the year 1682, which agreed so nearly with those of the comets of 1607 and 1531, that he concluded it to be the same body returning to the sun, at intervals of about seventy-five years. He consequently predicted its reappearance in the year 1758, or in the beginning of 1759. Science was not sufficiently advanced in the time of Halley to enable him to determine the perturbations this comet might experience; but Clairaut computed that it would be retarded in its motion a hundred days by the attraction of Saturn, and 518 by that of Jupiter, and consequently, that it would pass its perihelion about the middle of April, 1759, requiring 618 days more to arrive at that point than in its preceding revolution. This, however, he considered only to be an approximation, and that it might be thirty days more or less: the return of the comet on the 12th of March, 1759, proved the truth of the prediction. MM. Damoiseau and Pontécoulant have ascertained that this comet will return either on the 4th or the 7th of November, 1835; the difference of three days in their computations arises from their having employed different values for the masses of the planets. This is the first comet whose periodicity has been established; it is also the first whose elements have been determined from observations made in Europe; for although the comets which appeared in the years 240, 539, 565, and 837, are the most ancient whose orbits have been traced, their elements were computed from Chinese observations.'—pp. 364-5.

We may add to what is here said, that Mr. Lubbock has also investigated the course of this body, and has come to a conclusion somewhat different from both these above-mentioned astronomers. The 'Nautical Almanac' for 1835, just published, contains a representation of the path of the comet among the stars, according to each of these three mathematicians, its places being marked from Aug. 7, 1835, to Feb. 7, 1836. The positions, according to the different computations, though not very far asunder, are sufficiently distinct to make the separation, at a certain period, very wide. M. Pontécoulant, M. Damoiseau, and Mr. Lubbock, start their comets close together in August; but by the 4th of October, Pontécoulant is a whole length behind Damoiseau, (except these 'fiery steeds' have bodies and tails of portentous prolixity,) and Lubbock decidedly shoots a-head of both. It will be extremely interesting, when the period arrives, to observe which of the three lines Comet himself will select. We recommend this subject to those of our friends who have taken an interest in our recent philosophical disquisitions concerning the Turf, and especially if their 'adverse stars' prohibit a visit to Newmarket: for the stars, in this case, offer them a very sufficient compensation; and our amateurs, by backing one of the three calculated paths of this 'courser of celestial race,' as the true one, 'to be decided' by the comet himself when he makes his appearance, may have the luxury of *higher* play than has yet been known.

But we must return to Mrs. Somerville's chapter on Comets, and quote the account of another of these curious bodies. After speaking of Encke's comet, which has a period of 1207 days, she says—

'The other comet belonging to our system, which returns to its perihelion after a period of $6\frac{3}{4}$ years, has been accelerated in its motion by a whole day during its last revolution, which puts the existence of ether beyond a doubt, and forms a strong presumption in corroboration of the undulating theory of light. The comet in question was discovered by M. Biela at Johannisberg on the 27th of February, 1826, and ten days afterwards it was seen by M. Gambart at Marseilles, who computed its parabolic elements, and found that they agreed with those of the comets which had appeared in the years 1789 and 1795, whence he concluded them to be the same body moving in an ellipse, and accomplishing its revolution in 2460 days. The perturbations of this comet were computed by M. Damoiseau, who predicted that it would cross the plane of the ecliptic on the 29th of October, 1832, a little before midnight, at a point nearly 18484 miles within the earth's orbit; and as M. Olbers, of Bremen, in 1805, had determined the radius of the comet's head to be about 21136 miles, it was evident that its nebulosity would envelop a portion of the earth's orbit—a circumstance which caused great alarm in France, and not altogether without reason, for if any disturbing cause had delayed the arrival of the comet for one month, the earth must have through passed its head. M. Arago dispelled their fears by the excellent treatise on comets which appeared in the Annuaire of 1832, where

where he proves that, as the earth would never be nearer the comet than 24800000 British leagues, there could be no danger of collision.'—pp. 369-70.

We may observe that the alarm of which Mrs. Somerville here speaks, affords an example of the confusion of ideas, which popular views of scientific matters often involve; and thus shows us how valuable a boon it is to the mass of readers, when persons of real science, like Mrs. Somerville, condescend to write for the wider public, as in this work she does. The apprehensions with regard to Biela's (or, as it ought rather to be called, Gambart's) comet, which were entertained by our worthy neighbours, *tout le monde* of Paris, were of a kind somewhat peculiar. The expected arrival of this visiter, with his fiery train, produced a commotion scarcely inferior to that which was excited among the good people of Strasburg by the stranger in the red-plush inexpressibles. That his head or his tail would do us irreparable harm—that he would burn us with his nucleus—or drown or poison us with his atmosphere—were slight terrors compared with those excited by the combination of terms '*perturbations*' and '*orbite de la terre.*' It appeared that the comet would cross the earth's orbit; what mischief might not come of this? It was true that the earth would not be near the crossing at that time; but then, might not the orbit itself be seriously injured? Instead of an imaginary line in the trackless ocean of space, the fears of our friends appear to have represented to them the earth's orbit as a sort of railroad, which might be so damaged by what Mr. Campbell calls the 'bickering wheels and adamantine car' of the 'fiery giant,' that the earth must stick or run off, the next time the revolving seasons brought her to the fatal place. In M. Arago's agreeable and instructive article in the '*Annuaire du Bureau des Longitudes,*' written in order to calm the panic arising from these 'horrible imaginings,' he says,—

'Shall I be so fortunate as to do this? I hope so; yet without being very confident. Have I not seen persons who, while they acknowledged that the earth would not receive, in 1832, any *direct blow* from the comet, still believed that this body could not go through our orbit without *altering its form;* as if this orbit was a material thing; as if the parabolic path which a bomb is just going to describe, could be affected by passing through the space which other bombs had traversed before!!'

But we must not dwell too long on one part of Mrs. Somerville's work; we must recollect that her professed object is to illustrate 'The *Connexion* of the Physical Sciences.' This is a noble object; and to succeed in it would be to render a most important service to science. The tendency of the sciences has long been an increasing proclivity to separation and dismemberment. Formerly, the 'learned' embraced in their wide grasp all the branches of the tree of knowledge; the Scaligers and Vossiuses of former days were mathematicians as well as philologers, physical as well as antiquarian speculators. But these days are past; the students of books and of things are estranged from each other in habit and feeling. If a moralist, like Hobbes, ventures into the domain of mathematics, or a poet, like Goethe, wanders into the fields of experimental science, he is received with contradiction and contempt; and, in truth, he generally makes his incursions with small advantage, for the separation of sympathies and intellectual habits has ended in a destruction, on each side, of that mental discipline which leads to success in the other province. But the disintegration goes on, like that of a great empire falling to pieces; physical science itself is endlessly subdivided, and the subdivisions insulated. We adopt the maxim 'one science only can one genius fit.' The mathematician turns away from the chemist; the chemist from the naturalist; the mathematician, left to himself, divides himself into a pure mathematician and a mixed mathematician, who soon part company; the chemist is perhaps a chemist of electro-chemistry; if so, he leaves common chemical analysis to others; between the mathematician and the chemist is to be interpolated a '*physicien*' (we have no English name for *him*), who studies heat, moisture, and the like. And thus science, even mere physical science, loses all traces of unity. A curious illustration of this result may be observed in the want of any name by which we can designate the students of the knowledge of the material world collectively. We are informed that this difficulty was felt very oppressively by the members of the British Association for the Advancement of Science, at their meetings at York, Oxford, and Cambridge, in the last three summers. There was no general term by which these gentlemen could describe themselves with reference to their pursuits. *Philosophers* was felt to be too wide and too lofty a term, and was very properly forbidden them by Mr. Coleridge, both in his capacity of philologer and metaphysician; *savans* was rather assuming, besides being French instead of English; some ingenious gentleman proposed that, by analogy with *artist,* they might form *scientist,* and added that there could be no scruple in making free with this termination when we have such words as *sciolist, economist,* and *atheist*—but this was not generally palatable; others attempted to translate the term by which the members of similar associations in Germany have described themselves, but it was not found easy to discover an English equivalent for *natur-forscher.* The process of examination which it implies might suggest such undignified compounds as as *nature-poker* *, or *nature-peeper*, for these *naturæ curiosi*; but these were indignantly rejected.

The inconveniences of this division of the soil of science into infinitely small allotments have been often felt and complained of. It was one object, we believe, of the British Association, to remedy these inconveniences by bringing together the cultivators of different departments. To remove the evil in another way is one object of Mrs. Somerville's book. If we apprehend her purpose rightly, this is to be done by showing how detached branches have, in the history of science, united by the discovery of general principles.

'In some cases identity has been proved where there appeared to be nothing in common, as in the electric and magnetic influences; in others, as that of light and heat, such analogies have been pointed out as to justify the expectation that they will ultimately be referred to the same agent; and in all there exists such a bond of union, that proficiency cannot be attained in any one without a knowledge of others.'—*Preface.*

We may add, that in the same way in which a kindred language proves the common stock and relationship of nations, the connexion of all the sciences which are treated of in the work now before us is indicated by the community of that *mathematical* language which they all employ. Our space does not allow us to dwell on the illustration of this point, but we may select a passage or two. We cannot even refer to the curious sections on the properties of light; on the fringes of shadows, the colours of thin plates, the results of polarization, and of the analysis of polarized light after passing through crystals; on the evidence and proofs of the undulatory theory; which last great question our author rightly, as we conceive, judges to be now nearly settled in favour of the undulationists. But we may quote what she says on one of the analogies which we have already noticed:—

'It has been observed that heat, like light and sound, probably consists in the undulations of an elastic medium. All the principal phenomena of heat may actually be illustrated by a comparison with those of sound. The excitation of heat and sound are not only similar, but often identical, as in friction and percussion; they are both communicated by contact and radiation; and Dr. Young observes, that the effect of radiant heat in raising the temperature of a body upon which it falls resembles the sympathetic agitation of a string, when the sound of another string, which is in unison with it, is transmitted

* When the German association met at Berlin, a caricature was circulated there, representing the 'collective wisdom' employed in the discussion of their mid-day meal with extraordinary zeal of mastication, and dexterity in the use of the requisite implements, to which was affixed the legend—' Wie die natur-forscher natur-forschen,' which we venture to translate '*the poking of the nature-pokers.*'

to

to it through the air. Light, heat, sound, and the waves of fluids, are all subject to the same laws of reflection, and, indeed, their undulatory theories are perfectly similar. If, therefore, we may judge from analogy, the undulations of some of the heat-producing rays must be less frequent than those of the extreme red of the solar spectrum; but if the analogy were perfect, the interference of two hot rays ought to produce cold, since darkness results from the interference of two undulations of light—silence ensues from the interference of two undulations of sound—and still water, or no tide, is the consequence of the interference of two tides. The propagation of sound, however, requires a much denser medium than that either of light or heat; its intensity diminishes as the rarity of the air increases; so that at a very small height above the surface of the earth the noise of the tempest ceases, and the thunder is heard no more in those boundless regions where the heavenly bodies accomplish their periods in eternal and sublime silence.'—pp. 250, 251.

We refer to the following on account of the novelty of the subject:—

'After Mr. Faraday had proved the identity of the magnetic and electric fluids by producing the spark, heating metallic wires, and accomplishing chemical decomposition, it was easy to increase these effects by more powerful magnets and other arrangements. The following apparatus is now in use, which is in effect a battery, where the agent is the magnetic instead of the voltaic fluid, or, in other words, electricity.

'A very powerful horse-shoe magnet, formed of twelve steel plates in close approximation, is placed in a horizontal position. An armature consisting of a bar of the purest soft iron has each of its ends bent at right angles, so that the faces of those ends may be brought directly opposite and close to the poles of the magnet when required. Two series of copper wires—covered with silk, in order to insulate them—are wound round the bar of soft iron as compound helices. The extremities of these wires, having the same direction, are in metallic connexion with a circular disc, which dips into a cup of mercury, while the ends of the wires in the opposite direction are soldered to a projecting screw-piece, which carries a slip of copper with two opposite points. The steel magnet is stationary; but when the armature, together with its appendages, is made to rotate horizontally, the edge of the disc always remains immersed in the mercury, while the points of the copper slip alternately dip in it and rise above it. By the ordinary laws of induction, the armature becomes a temporary magnet while its bent ends are opposite the poles of the steel magnet, and ceases to be magnetic when they are at right angles to them. It imparts its temporary magnetism to the helices which concentrate it; and while one set conveys a current to the disc, the other set conducts the opposite current to the copper slip. But as the edge of the revolving disc is always immersed in the mercury, one set of wires is

constantly

constantly maintained in contact with it, and the circuit is only completed when a point of the copper slip dips in the mercury also; but the circuit is broken the moment that point rises above it. Thus, by the rotation of the armature, the circuit is alternately broken and renewed; and as it is only at these moments that electric action is manifested, a brilliant spark takes place every time the copper point touches the surface of the mercury. Platina wire is ignited, shocks smart enough to be disagreeable are given, and water is decomposed with astonishing rapidity, by the same means, which proves beyond a doubt the identity of the magnetic and electric agencies, and places Mr. Faraday, whose experiments established the principle, in the first rank of experimental philosophers.'—pp. 339, 340.

The following speculations are somewhat insecure, but they are proposed as conjectures rather than assertions, and are well worth notice :—

'From the experiments of Mr. Faraday, and also from theory, it is possible that the rotation of the earth may produce electric currents in its own mass. In that case, they would flow superficially in the meridians, and if collectors could be applied at the equator and poles, as in the revolving plate, negative electricity would be collected at the equator, and positive at the poles; but without something equivalent to conductors to complete the circuit, these currents could not exist.

'Since the motion, not only of metals but even of fluids, when under the influence of powerful magnets, evolves electricity, it is probable that the gulf stream may exert a sensible influence upon the forms of the lines of magnetic variation, in consequence of electric currents moving across it, by the electro-magnetic induction of the earth. Even a ship passing over the surface of the water, in northern or southern latitudes, ought to have electric currents running directly across the line of her motion. Mr. Faraday observes, that such is the facility with which electricity is evolved by the earth's magnetism, that scarcely any piece of metal can be moved in contact with others without a development of it, and that consequently, among the arrangements of steam engines and metallic machinery, curious electro-magnetic combinations probably exist, which have never yet been noticed.

'What magnetic properties the sun and planets may have it is impossible to conjecture, although their rotation might lead us to infer that they are similar to the earth in this respect. According to the observations of MM. Biot and Gay-Lussac, during their aërostatic expedition, the magnetic action is not confined to the surface of the earth, but extends into space. A decrease in its intensity was perceptible; and as it most likely follows the ratio of the inverse square of the distance, it must extend indefinitely. It is probable that the moon has become highly magnetic by induction, in consequence of her proximity to the earth, and because her greatest diameter always points towards it. Should the magnetic, like the gravitating force, extend through space, the induction of the sun, moon, and planets must occasion perpetual variations in the intensity of terrestrial magnetism, by the continual changes in their relative positions.

'In the brief sketch that has been given of the five kinds of electricity, those points of resemblance have been pointed out which are characteristic of one individual power; but as many anomalies have been lately removed, and the identity of the different kinds placed beyond a doubt by Mr. Faraday, it may be satisfactory to take a summary view of the various coincidences in their modes of action on which their identity has been so ably and completely established by that great electrician.'—pp. 352-354.

We shall not here pursue this subject, as the examination of it at suitable length would lead us too far. We add some examples of the information contained in this work :—

'M. Melloni, observing that the maximum point of heat is transferred farther and farther towards the red end of the spectrum, according as the substance of the prism is more and more permeable to heat, inferred that a prism of rock-salt, which possesses a greater power of transmitting the calorific rays than any other known body, ought to throw the point of greatest heat to a considerable distance beyond the visible part of the spectrum—an anticipation which experiment fully confirmed, by placing it as much beyond the dark limit of the red rays as the red part is distant from the bluish-green band of the spectrum.'—p. 237.

The establishment of the identity of charcoal and diamond led sanguine persons to anticipate the time when our home-manufactures should rival the produce of Golconda. In such speculations it is but reasonable to take into account the reflection with which Mrs. S. closes the following passage:—

'It had been observed that, when metallic solutions are subjected to galvanic action, a deposition of metal, generally in the form of minute crystals, takes place on the negative wire: by extending this principle, and employing a very feeble voltaic action, M. Becquerel has succeeded in forming crystals of a great proportion of the mineral substances precisely similar to those produced by nature. The electric state of metallic veins makes it possible that many natural crystals may have taken their form from the action of electricity bringing their ultimate particles, when in solution, within the narrow sphere of molecular attraction already mentioned as the great agent in the formation of solids. Both light and motion favour crystallization. Crystals which form in different liquids are generally more abundant on the side of the jar exposed to the light; and it is a well-known fact that still water, cooled below thirty-two degrees, starts into crystals of ice the instant it is agitated. Light and motion are intimately connected with electricity, which may, therefore, have some influence on the laws of aggregation; this is the more likely, as a feeble action is alone necessary, provided it be continued for a sufficient time. Crystals

tals formed rapidly are generally imperfect and soft, and M. Becquerel found that even years of constant voltaic action were necessary for the crystallization of some of the hard substances. If this law be general, how many ages may be required for the formation of a diamond!'—pp. 307, 308.

The following is the history of the successive approximations to the place of the magnetic pole:—

'In the year 1819, Sir Edward Parry, in his voyage to discover the north-west passage round America, sailed near the magnetic pole; and in 1824, Captain Lyon, on an expedition for the same purpose, found that the magnetic pole was then situated in 63° 26′ 51″ north latitude, and in 80° 51′ 25″ west longitude. It appears, from later researches, that the law of terrestrial magnetism is of considerable complexity, and the existence of more than one magnetic pole in either hemisphere has been rendered highly probable; that there is one in Siberia seems to be decided by the recent observations of M. Hansteen,—it is in longitude 102° east of Greenwich, and a little to the north of the 60th degree of latitude: so that, by these data, the two magnetic poles in the northern hemisphere are about 180° distant from each other: but Captain Ross, who is just returned from a voyage in the polar seas, has ascertained that the American magnetic pole is in 70° 14′ north latitude, and 96° 40′ west longitude. The magnetic equator does not exactly coincide with the terrestrial equator; it appears to be an irregular curve, inclined to the earth's equator at an angle of about 12°, and crossing it in at least three points in longitude 113° 14′ west, and 66° 46′ east of the meridian of Greenwich, and again somewhere between 156° 30′ of west longitude and 116° east.'—pp. 310, 311.

We may add that the place thus determined by Captain Ross agrees with that collected from considerations, which we conceive to be more trustworthy than observations made at one place, with so imperfect an instrument as a dipping needle is for such purposes. In Mr. Barlow's Memoir 'On the present situation of the Magnetic Lines of Equal Variation,' just published in the Philosophical Transactions, he says, 'The pole itself'—(as determined by Captain Ross and his nephew)—'is precisely that point on my globe and chart, in which, by supposing all the lines to meet, the separate curves would best preserve their unity of character, both separately and as a system.'

Our readers cannot have accompanied us so far without repeatedly feeling some admiration rising in their minds, that the work of which we have thus to speak is that of a woman. There are various prevalent opinions concerning the grace and fitness of the usual female attempts at proficiency in learning and science; and it would probably puzzle our most subtle analysts of common sense or common prejudice to trace the thread of rationality or irrationality which

which runs through such popular judgments. But there is this remarkable circumstance in the case,—that where we find a real and thorough acquaintance with these branches of human knowledge, acquired with comparative ease, and possessed with unobtrusive simplicity, all our prejudices against such female acquirements vanish. Indeed, there can hardly fail, in such cases, to be something peculiar in the kind, as well as degree, of the intellectual character. Notwithstanding all the dreams of theorists, there is a sex in minds. One of the characteristics of the female intellect is a clearness of perception, as far as it goes: with them, action is the result of feeling; thought, of seeing; their practical emotions do not wait for instruction from speculation; their reasoning is undisturbed by the prospect of its practical consequences. If they theorize, they do so

'In regions mild, of calm and serene air,
Above the smoke and stir of this dim spot
Which men call earth.'

Their course of action is not perturbed by the powers of philosophic thought, even when the latter are strongest. The heart goes on with its own concerns, asking no counsel of the head; and, in return, the working of the head (if it does work) is not impeded by its having to solve questions of casuistry for the heart. In men, on the other hand, practical instincts and theoretical views are perpetually disturbing and perplexing each other. Action must be conformable to rule; theory must be capable of application to action. The heart and the head are in perpetual negotiation, trying in vain to bring about a treaty of alliance, offensive and defensive. The end of this is, as in many similar cases, inextricable confusion—an endless seesaw of demand and evasion. In the course of this business, the man is mystified; he is involved in a cloud of words, and cannot see beyond it. He does not know whether his opinions are founded on feeling or on reasoning, on words or on things. He learns to talk of matters of speculation without clear notions; to combine one phrase with another at a venture; to deal in generalities; to guess at relations and bearings; to try to steer himself by antitheses and assumed maxims. Women never do this: what they understand, they understand clearly; what they see at all, they see in sunshine. It may be, that in many or in most cases, this brightness belongs to a narrow Goshen; that the heart is stronger than the head; that the powers of thought are less developed than the instincts of action. It certainly is to be hoped that it is so. But, from the peculiar mental character to which we have referred, it follows, that when women are philosophers, they are likely to be lucid ones; that when they extend the range of their speculative

tive views, there will be a peculiar illumination thrown over the prospect. If they attain to the merit of being profound, they will add to this the great excellence of being also clear.

We conceive that this might be shown to be the case in such women of philosophical talent as have written in our own time. But we must observe, that none of these appear to have had possession of the most profound and abstruse province of human knowledge, mathematics, except the lady now under review. Indeed the instances of eminent female mathematicians who have appeared in the history of the world are very rare. There are only two others who occur to us as worthy of entirely honourable notice—Hypatia and Agnesi; and both these were very extraordinary persons. It is, indeed, a remarkable circumstance, that the 'Principia' of Newton were in the last century translated and commented on by a French lady; as the great French work on the same subject, in our own time, the 'Mécanique Céleste' of Laplace, has been by a lady of this country. But Madame de Chastelet's whole character and conduct have not attracted to her the interest which belongs to the other two. The story of Hypatia is unhappily as melancholy as it is well known. She was the daughter of Theon, the celebrated Platonist and mathematician of Alexandria, and lived at the time when the struggle between Christianity and Paganism was at its height in that city. Hypatia was educated in the doctrines of the heathen philosophy, and in the more abstruse sciences; and made a progress of which contemporary historians speak with admiration and enthusiasm. Synesius, bishop of Ptolemais, sends most fervent salutations 'to her, the philosopher, and that happy society which enjoys the blessings of her divine voice.' She succeeded her father in the government of the Platonic school, where she had a crowded and delighted audience. She was admired and consulted by Orestes, the governor of the city, and this distinction unhappily led to her destruction. In a popular tumult she was attacked, on a rumour that she was the only obstacle to the reconciliation of the governor and of Cyril the archbishop. 'On a fatal day,' says Gibbon, 'in the holy season of Lent, Hypatia was torn from her chariot, stripped naked, dragged to the church, and inhumanly butchered by the hands of Peter the reader and a troop of savage and merciless fanatics: her flesh was scraped from her bones with oyster-shells, and her quivering limbs were delivered to the flames.'

From this strange and revolting story, we turn to the other name which we have mentioned, Madame Agnesi, who flourished during the last century at Bologna, where her father was professor; and when the infirmity of his health interfered with his discharge

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of this duty, the filial feelings of the daughter were gratified by a permission from Pope Benedict XIV. to fill the professorial chair, which she did with distinguished credit. Before this, at the age of nineteen (in 1738), she had published 'Propositiones Philosophicæ;' and, along with a profound knowledge of analysis, she possessed a complete acquaintance with the Latin, Greek, Hebrew, French, German, and Spanish languages. Her 'Instituzioni Analitiche' were translated by Colson, the Lucasian professor of mathematics at Cambridge; and this version was at one time a book in familiar use at that university. The end of her history, though not of the terrible nature of that of Hypatia, is perhaps what an Englishwoman would look upon as rather characteristic than happy. She relinquished the studies of her early life, and went into the monastery of the *Blue* Nuns, at Milan, where she died January 9, 1799.*

We must leave it to some future reviewers to tell of the rapid acquisitions and extensive accomplishments of Mrs. Somerville; which, indeed, will bear confronting with those of Hypatia and Agnesi. Her profound mathematical work on the 'Mechanism of the Heavens' has already been treated of in this Journal; the germ of the present treatise was the preliminary dissertation to that work; and what opinion this development of that sketch is likely to give the world at large of her talents as a philosopher and writer, we hope we have enabled our readers to determine.

The reader of ancient folios (if any such persons remain in the land) will easily imagine how, a few centuries ago, such works as these would have come forth preluded by 'commendatorie verses,' in which the author would have been compared to Minerva and to Urania, or probably (very reasonably) preferred to all the nine Muses and the goddess to boot. In a case so fitted to excite unusual admiration, we are not at all surprised that the ancient usage should have been thought of; and though neither Mrs. Somerville's modesty nor the fashion of the day would authorize the insertion of such effusions in her pages, we happen to be able to lay before our readers one or two of these productions: we presume they are intended to be valued (like coronation medals struck in base metal) rather for the rarity of the occasion than the ex-

* We have not met with any account of this sisterhood; but we conceive that when Protestant nunneries are established in this country, (as we have occasionally recommended,) it would be desirable to have one foundation, at least, of this colour. We presume that they would substitute a review for the breviary, and a confidential critic or professor for the father confessor. We do not pretend to suggest any rule for the *dress* of the order; but their principal daily meeting would probably be a repast upon bread and water—(*toasted* bread and *warm* water in this severe climate could not be considered blameable indulgences;) and it might correspond with the *lauds* of Catholic institutions—'*Lauds*,—the last portion of *nocturns*—*officium matutinum*—*vespertinum*.'

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cellence of the article; and with that view we shall insert two specimens from the mint of Cambridge. The first is a sonnet:—

'Lady, it was the wont in earlier time,
When some fair volume from a valued pen,
Long looked for, came at last, that grateful men
Hailed its forthcoming in complacent lays;
As if the Muse would gladly haste to praise
That which her mother, Memory, long should keep
Among her treasures. Shall such custom sleep
With us, who feel too slight the common phrase
For our pleased thoughts of you: when thus we find
That dark to you seems bright, perplexed seems plain,
Seen in the depths of a pellucid mind,
Full of clear thought; free from the ill and vain
That cloud our inward light? An honoured name
Be yours, and peace of heart grow with your growing fame.'

Another of these versifiers proceeds thus, after a well-known model:—

'Three women, in three different ages born,
Greece, Italy, and England did adorn;
Rare as poetic minds of master flights,
Three only rose to science' loftiest heights.
The first a brutal crowd in pieces tore,
Envious of fame, bewildered at her lore;
The next through tints of darkening shadow passed,
Lost in the azure sisterhood at last;
Equal to these, the third, and happier far,
Cheerful though wise, though learned, popular,
Liked by the many, valued by the few,
Instructs the world, yet dubbed by none a Blue.'

We are not going to draw our critical knife upon these *nugæ academicæ*; but we may observe, that we believe our own countrywoman does not claim to have been born in a different century from Madame Agnesi; and that, though Hypatia talked Greek, as Mrs. Somerville does English, the former was an Egyptian, and the latter, we are obliged to confess, is Scotch by her birth, though we are very happy to claim her as one of the brightest ornaments of England.

ART. IV.—*The Doctor, &c.* 2 vols. 12mo. London. 1834.

THIS work has excited more attention than any one belonging, or approaching, to the class of *novels*, which has appeared in England for a considerable number of years; and we are not at all disposed to wonder that such should have been the case. It is broadly distinguished from the mass of books recently published in the same shape and form, both by excellencies of a very high order, and by defects, indicating such occasional contempt of sound judgment, and sense, and taste, as we can hardly suppose in a strong and richly cultivated mind, unless that mind should be in a certain measure under the influence of disease. The author says of one of his characters:—'He was born with one of those heads in which the thin partition that divides great wit from folly is wanting.' The partition in his own head would seem to be a moveable one. A clearer or a more vigorous understanding than he in his better parts exhibits, we have seldom encountered; but two-thirds of his performance look as if they might have been penned in the vestibule of Bedlam. The language, however, even where the matter is most absurd, retains the ease, the strength, and the purity of a true master of English; and there occur, ever and anon, in chapters over which no human being but a reviewer will ever travel for the second time, turns of expression which would of themselves justify us in pronouncing the author of this 'apish and fantastic' nondescript to be a man of genius.

The writer is often a wise one—but his attempts at what is now called *wit* are, in general, unsuccessful: nor can we speak much better of his humour, though he has undoubtedly a few passages which might make Heraclitus chuckle. With these rare exceptions, his jocularity is pedantic and chilling—his drollery wire-drawn, super-quaint, Whistlecraftish. The *red* letters and mysterious monogram of his title-page—the *purple* German-text of his dedication to *the Bhow Begum Redora Niabarma*—his division of chapters into ante-initial, initial, and post-initial—his inter-chapters—his post-fixed preface, &c. &c.—what are all these things but paltry imitations of the poorest sort of fun in Tristram Shandy? All his jesting about bells, and 'the manly and English art' of bell-ringing, (excepting one *Dutch* quotation,) appears to us equally dolorous. As for his bitter sneers at Lord Byron—his clumsy and grossly affected contempt for Mr. Jeffrey—and the heavy magniloquence of his own self-esteem—we dismiss them at once in silence. They mark as evidently the disruption of the 'thin partition,' as his prolix babble on the garden-physic of his great-grandmother, the drivelling of the alchemists, and the succession of the mayors of Doncaster—or his right merry and conceited elaboration of one of the dirtiest of all the practical jokes in Rabelais.

If we were not quite serious in our suspicion that 'The Doctor' is the work of a man who stands more in need of physic than of criticism, we should have felt it our duty to illustrate, by citations, the justice of the language which we have not hesitated to apply